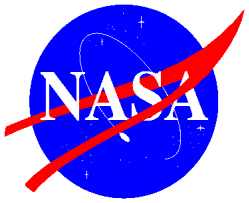

ED27-CDL-SOP-001
Baseline
August 2, 1999

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

# STANDARD OPERATING PROCEDURE

## ED27 / STRUCTURAL AND DYNAMICS TEST GROUP

# CONTROL DYNAMICS LABORATORY

**CHECK THE MASTER LIST—**
**VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE**

# DOCUMENT HISTORY LOG

| Status (Baseline/ Revision/ Canceled) | Document Revision | Effective Date | Description |
|---|---|---|---|
| Baseline | | 2-24-98 | Document number ED73-CDL-SOP-001 |
| Baseline | Draft 1 | 8-2-99 | Updated document numbers from reorganization and integrated document system. |
| | | | |
| | | | |

# STANDARD OPERATING PROCEDURE FOR THE CONTROL DYNAMICS LABORATORY

## 1. SCOPE

1.1 Scope. This standard operating procedure (SOP) provides instructions for the general operating procedures of performing tests and experiments in the Control Dynamics Laboratory (CDL) at Marshall Space Flight Center.

1.2 Purpose. The CDL is used to implement, test, and verify control methods for all types of mechanical and mechanical /optical systems. The CDL characterizes and modifies the structural dynamic behavior of these systems through system identification and control, structure interaction methods and techniques.

1.3 Applicability. This work instruction applies to all personnel in the CDL.

1.4 System Description. Definitions in MPG-1410.1, ED27-OWI-001, ED27-OWI-002, and ED27-OWI-003 apply.

1.5 General. The test engineer of the CDL shall be responsible for coordination and enforcement of the document activities.

## 2. APPLICABLE DOCUMENTS

| | |
|---|---|
| MPG 8730.5 | ***Control of Inspection, Measuring, and Test Equipment*** |
| ED27-OWI-M&V-001 | ***Document Control*** |
| ED27-OWI-M&V-002 | ***Quality Records Control*** |
| ED27-OWI-M&V-003 | ***Test Report Control*** |
| ED27-CDL-FOP-001 | ***Use of Ometron Laser Vibrometer for Dynamic Testing*** |
| ED27-EMA-FOP-001 | ***Mounting of PCB Tri-Axial Adapter for Modal Surveys*** |

## 2. APPLICABLE DOCUMENTS (continued)

| | |
|---|---|
| ED27-EMA-FOP-002 | ***PCB Multichannel Acclerometer System Setup and Calibration for Modal Surveys*** |
| ED27-EMA-FOP-006 | ***Air Bag Functional Test for Modal Surveys*** |
| ED27-EMA-FOP-007 | ***Bungee Functional Test for Modal Surveys*** |
| ED27-EMA-FOP-009 | ***Calibration of PCB 333A, 333B Accelerometers for Modal Testing*** |
| ED27-EMA-FOP-013 | ***ICP Accelerometer Calibration for Modal Surveys*** |

## 3. REFERENCE DOCUMENTS

***Associated Equipment Manuals***

***SSC Facility Operator's Manual***

***Operator's Manual for the CSI/CASES GTF***

***Filter Control Unit User's Manual  MN-33B***

***Operating Instructions for 900 Watt PWM Servo Amplifier with Current Loop Configuration for Brushless DC Motors BLM1-07012CBXX***

***BDS5 Goldline™ Positioner User's Manual BDS5-MAN-2.0.4***

## 4. SAFETY

All set-up and operating procedures mentioned under user manuals *BLM1-07012CBXX* and *MN-33B* shall be followed in order to minimize the risk of injury due to electric shock when using the filter control unit and the 900 watt PWM servo amplifier for the brushless DC motor. Likewise, when using the *BDS5 Goldline positioner*, all mounting and wiring procedures shall be implemented as specified in document *BDS5-MAN-2.0.4*.

Use of the ground test facilities, ACES and CASES, shall conform with the appropriate operators manuals to ensure safe system level performance.

When using any laser equipment, care shall be taken in order to prevent the laser from being operated in or around any flammable or combustible material and that controls are in place to prevent exposure of the laser into eyes of test personnel or passersby.

## 5. ACTIVATION PREPARATIONS

5.1 All appropriate and pertinent documents regarding the operation and procedure of various elements of the CDL shall be followed.

5.2 The Test Engineer shall use appropriate procedures as necessary and/or specified to provide a consistent, reliable monitoring, simulation, test, and/or data acquisition of test articles in the CDL.

5.3 The Test Engineer shall select appropriate instrumentation to measure the dynamic response of a test article. Any calibration and mounting procedures shall be conducted as specified by the above applicable documents.

5.4 Before using test equipment, the Test Engineer shall verify that the equipment has been properly calibrated and the calibration date has not expired. Equipment calibration and servicing shall conform to MPG 8730.5, in addition to pertinent service manuals.

## 6. PROCEDURE

6.1 Set up and configure the necessary test equipment and software for the test. Validate and characterize proper operation following the procedures given in the above listed documents.

6.2 Install the test article in or on its appropriate test fixture. Mount any necessary instrumentation to the test article. When performing modal tests the following applicable FOPs shall be followed if the associated equipment is used:
ED27-EMA-FOP-001, ED27-EMA-FOP-002, ED27-EMA-FOP-006, ED27-EMA-FOP-007, ED27-EMA-FOP-009, ED27-EMA-FOP-013

6.3 Follow the appropriate procedures given in the above applicable documents regarding equipment and/or facility operation. Tests using the *ACES* or *CASES* ground test facilities shall follow the procedure given in *SSC Facility Operator's Manual* or the *Operator's Manual for the CSI/CASES GTF.* Tests performed using the Ometron® *VPI Sensor* shall conform to the procedures set forth in ED27-CDL-FOP-001. The test engineer shall determine which instrument(s) are most appropriate to use.

6.4 Data acquisition shall conform to the appropriate test plan. The test shall be performed until the test engineer determines that an appropriate amount of data is properly collected.

## 7. POST TEST VERIFICATION

The last page of a TCP will be a "Post Test Verification Sheet". TCPs covering testing of certification test articles will use the sheet with a Quality Monitor sign-off. See Appendix A for the form.

# APPENDIX A

# POST-TEST VERIFICATION

The Test and Checkout Procedure _____ has been satisfactorily completed and documented.

Test Engineer Date

Quality Monitor Date